

REMARKS

Claims 1, 2, 4-7, 15 and 17 are pending in the application. Claims 3, 8-14 and 16 were previously withdrawn. Claims 1, 2, 4 and 5 have been amended by way of the present amendment. Reconsideration is respectfully requested.

Claim Rejections under 35 U.S.C. § 112

Claims 4-5 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2 and 4-5 have been amended to clarify the invention and overcome this outstanding rejection. Support for the amendments is provided by the original specification, figures and claims. Therefore, it is respectfully submitted that the amendments raise no questions of new matter and that the amended claims are now definite.

Rejections under 35 U.S.C. § 103

Claims 1-2, 4-7, 15 and 17 have been rejected under 35 U.S.C. §103 as being unpatentable over Russian Patent No. 2140018 (Brodov et al.) in view of either U.S. Patent No. 3,299,822 (Payne) or U.S. Patent No. 6,093,004 (Varadhan et al.). Reconsideration is respectfully requested.

Claim 1 has been amended by way of the present amendment. In particular, claim 1 has been amended to recite:

A rotary screw machine of volume type comprising:
a body having a main axis X_m and
two members consisting of
 a male member; and
 a female member surrounding said male member,
 wherein an outer surface of the male member is a male
 surface and an inner surface of the female member defines a
 female surface,
 said male and female surfaces being helical surfaces having
 respective axes X_m and X_f that are parallel and spaced apart by a
 length E,
 said male and female surfaces defining at least one working
 chamber by formation of linear contacts of said male and female

surfaces and relative displacement of said male and female members,

 said male and female surfaces being further defined about said axes Xm and Xf, respectively, by a nominal profile in a cross section of the mechanism,

 said profile of the male surface defining a male profile having an order of symmetry Nm with respect to a center Om located on said male axis Xm,

 said profile of the female surface defining a female profile having an order of symmetry Nf with respect to a center Of located on said female axis Xf,

 said rotary screw machine further having a main synchronizing coupling comprising a crank like mechanism generating an eccentricity E between said main axis X and one of the axes (Xm, Xf),

 characterized in that a first one of said male member and said female member is hinged in said body and is able to rotate on itself about its fixed axis (Xm; Xf) according to a rotational motion,

 in that the crank like mechanism 32 further comprises:

 a first shaft like end 32' and

 a second shaft like end 32'' hinged in the body 30, parallel to the first shaft like end 32' with said length E between the first shaft like end and the second shaft like end.

 in that said crank like mechanism is connected to the other of said male member or said female member not hinged in said body to allow the axis (Xf; Xm) of said other of said male member or said female member to revolve about the fixed axis (Xm; Xf) of said first one of said male member and said female member according to an orbital revolution motion having said length E as a radius, and

 in that said rotary screw machine comprises a main synchronizer synchronizing said swiveling motion and said orbital revolution motion, one with respect to the other, so that said male and female mesh together.

Support for the amendment is provided by the original specification, figures and claims. In particular, FIG. 11, the male member 10 provides at one end an internal ring gear 50 that engages with a pinion 52 rigidly fixed on the female member 20 and hinged in the main body 30. In addition, FIG. 11 illustrates a rotary screw volume machine similar to the rotary screw with

three degrees of freedom, one of them being independent and with one-channel rotational means **31** and that this rotary screw volume machine comprises the female member **20** of screw shape (two arcs), the three-arcs male member **10** (see FIG. 12), the stationary body **30**, the crank like mechanism comprising the crank organ **32** hinged with a pivot link in the main body **30** having the main axis **X**, so that the axis **Xm** of the male member **10** is able to revolve about the female axis **Xf** which is aligned with the main axis **X** and the female member **20** is able to rotate on itself about the main axis **X**.

FIG.11

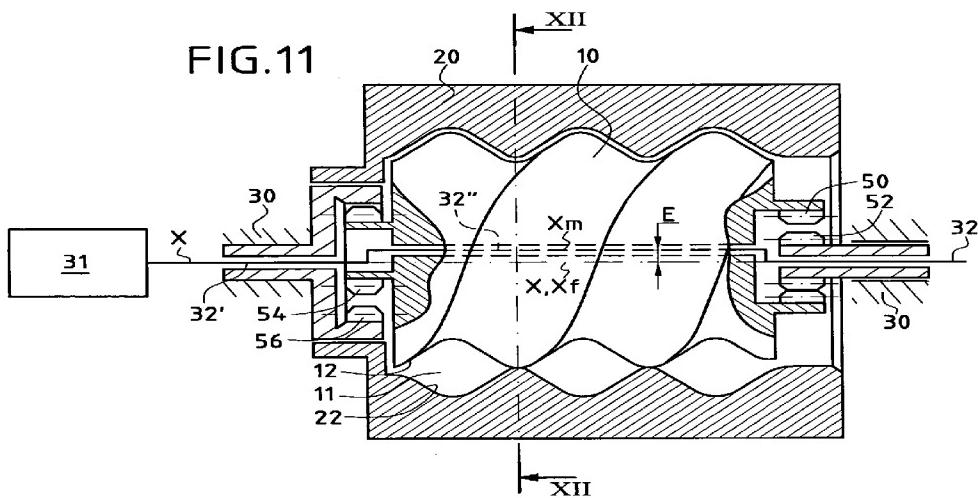
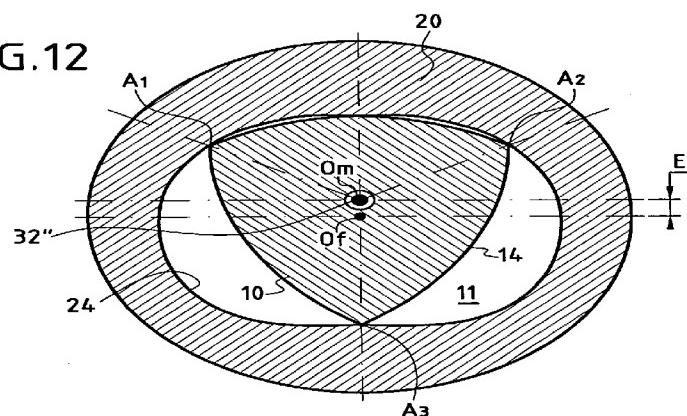


FIG.12



Furthermore, FIG. 11 discloses a crank like mechanism having a crank organ **32** which hinged connects the main body **30** and the male member **10**, and presenting an eccentricity equal to **E**, wherein the crank organ **32** is composed by a first shaft like end **32'** hinged in the main body **30** and a second shaft like end **32''** which is parallel, but brought out of the first shaft like

end 32' with the distance E. Thus, **FIG. 11** and the specification disclose the first shaft like end 32' is aligned with the axis X which correspond to the driving axis of crank organ 32, and the second shaft like end 32'' is aligned with the driven axis of this crank organ 32 which is coaxial with the axis Xm, while being offset of a distance E with respect to the main axis X.

Therefore, in consideration of the disclosure above, it is respectfully submitted that the amendments raise no question of new matter.

Brodov et al. discloses a method of conversion of motion in a positive displacement machine with conjugated elements of curved form. In particular, **Figures 9 and 10 of Brodov et al.** discloses a trochoid machine with two degrees of freedom including a trochoid stator 5 with a center O and flat end walls. In addition, Brodov et al. discloses a three-node rotor 1 that executes a planetary movement around center O with circumference passing through point O₁, while the rotor 1 moves with angular velocity around its center O₁. Further, Brodov et al. discloses pairs of round gears 3, 4; a stationary housing 6; a synchronizing link in the form of crankshaft 7; and an immobile round gear 8 to form a counter-rotational trochoid positive displacement machine. Furthermore, Brodov et al. disclose information regarding the eccentricity (e) and that the value of e is usually small.

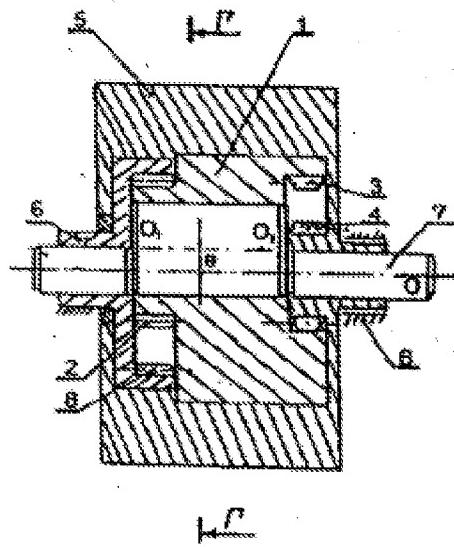


Figure 9

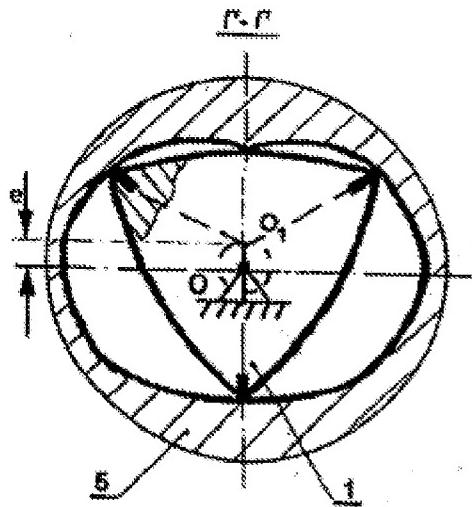


Figure 10

However, it is respectfully submitted that Brodov et al. nowhere discloses, as amended claim 1 recites:

in that a first one of said male member and said female member is hinged in said body and is able to rotate on itself about its fixed axis (X_m ; X_f) according to a rotational motion,

in that the crank like mechanism 32 further comprises:

a first shaft like end 32'; and

a second shaft like end 32'' hinged in the body 30, parallel to the first shaft like end 32' with said length E between the first shaft like end and the second shaft like end (emphasis added).

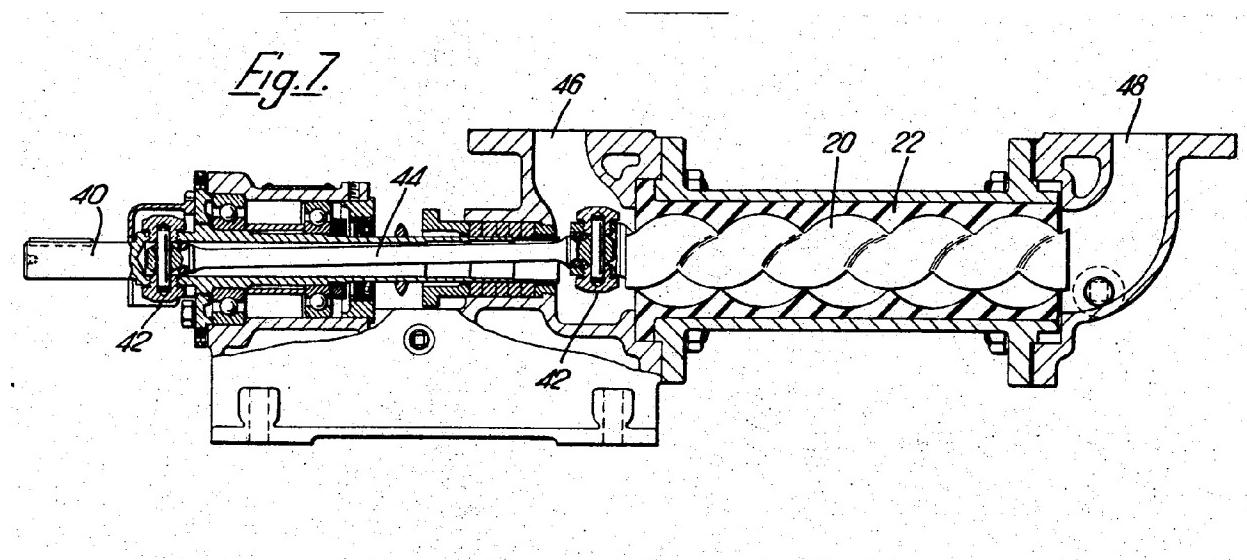
That is, as can be clearly seen by comparing FIG. 9 above of Brodov et al. with FIG. 11 above from the present application, Brodov et al. nowhere discloses the recited “second shaft like end 32” hinged in the body 30, parallel to the first shaft like end 32’ with said length E between the first shaft like end and the second shaft like end,” as recited in amended claim 1.

In fact, Brodov et al. appears to only disclose “a planetary movement around center **O** with circumference passing through point **O₁**, while the rotor **1** moves with angular velocity around its center **O₁**” That is, a single shaft wherein **O** and **O₁** are merely axes. Thus, it is

respectfully submitted that Brodov et al. does not disclose all of the limitations of the claimed invention.

In addition, the outstanding Office Action acknowledges other deficiencies in Brodov et al. and attempts to overcome these deficiencies by combining Brodov et al. with either one of Payne or Varadan et al. However, neither Payne nor Varadan et al. can overcome all of the deficiencies of Brodov et al. as discussed below.

Payne discloses a new or improved helical gear pump. **FIG. 5** of Payne discloses a pump in which the inner member **20** is provided with three points of maximum radius and the outer member **22** is provided with two points of minimum radius. In addition, **FIG. 7** of Payne discloses the pump is of helical form.



In addition Varadan et al. discloses a pump or motor having a three-lobed rotor capable of being used within a hypocycloidal two-lobed stator that is designed primarily for use with a one-lobed rotor.

However, it is respectfully submitted that neither Payne nor Varada et al. nowhere disclose, as amended claim 1 recites:

in that a first one of said male member and said female member is hinged in said body and is able to rotate on itself about its fixed axis (X_m; X_f) according to a rotational motion,

in that the crank like mechanism 32 further comprises:

*a first shaft like end 32'; and
a second shaft like end 32" hinged in the body 30, parallel
to the first shaft like end 32' with said length E between the first
shaft like end and the second shaft like end* (emphasis added).

That is, neither neither Payne nor Varada et al. can overcome the deficiencies of Brodov et al. discussed above. Thus, it is respectfully submitted that none of Payne, Varada et al. or Brodov et al., whether taken alone or in combination, disclose, suggest or make obvious the claimed invention. Therefore, it is respectfully submitted that amended independent claim 1, and claims dependent thereon, patentably distinguish over the applied art.

Conclusion

In view of the foregoing, Applicant respectfully submits that this application is now in condition for allowance. A notice to this effect is respectfully requested. In the event the Examiner believes an interview might serve to advance the prosecution of this application in any way, the undersigned attorney is available at the telephone number noted below.

Please charge any fees due with this paper to our Deposit Account No. 22-0185, under Order No. 22193-00009-US1 from which the undersigned is authorized to draw.

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Respectfully submitted,

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